

Investigation and Remediation

Tanks Down East

by W. David McCaskill

David McCaskill is an environmental engineer with the Maine Department of Environmental Protection. **Tanks Down East** was once a regular feature of LUSTLine. It's been a long hiatus, but Dave's back. As always, we welcome our readers' comments.



A Little Drop'll Do Ya

Maine Study Finds the Presence of MTBE in Drinking Water Wells to Be Widespread and of Curious Origin

It was May, the air was hovering above freezing, mud season was tailing off, and we were finally recovering from the after effects of the "Big Ice Storm of 1998." On top of that, our UST replacement schedule deadline was a full year ahead of the rest of the nation—nonconforming tanks were springing out of the ground like fiddleheads along the Kennebec River. Things seemed pretty cushy here in the Land of Lobster. But then, just like New England weather, there was a sudden atmospheric shift. One day the newspaper headlines are touting the economic benefits of the upcoming tourist season, the next day they're railing about three separate stories on MTBE contamination!

The MTBE sites were all "high profile"—a public drinking-water well field with low levels of MTBE but high levels of public anxiety; a private well belonging to an anxious resident in that same town, who had his well tested and reported high levels of MTBE to the press; and a school well screaming with MTBE.

Needless to say, the "town fathers" in the affected communities were concerned about the reputation of their drinking water, especially with tourist season just around the corner. Of course, there was a lot of finger pointing.

A Viruliferous Dilemma

It was like we were back in those heady days of LUST 10 years ago.

Groundwater contamination was back in the news in full force. But now a new four-letter word had been added to the public lexicon—MTBE (methyl butyl tertiary ether) and it was grabbing all the media headlines and sound bites. (Maine's use of reformulated gasoline [RFG], which contains approximately 11 percent MTBE by volume, was launched in 1995 to meet the Clean Air Act [CAA] requirements for reducing ozone-producing automobile exhaust.)

To make a long and sordid story short, the water district wells were contaminated with around 0.4 to 4.7 ppb (it doesn't sound like much—but you tell the townspeople that) of MTBE from several possible overfills (approximately 10 gallons each) associated with a double-walled UST system at a convenience store that had opened last July. (See *LUSTLine* # 30—"Holes in Our UST Systems.") The MTBE levels around the tank area reached 7,000 ppb at one point. And...oh....that new convenience store/gas station was built just 700 to 1,000 feet from the water district wells.

The contamination found by the homeowner, who lived two miles away from the convenience store, was only the tip of that iceberg; 11 households in that neighborhood had wells with MTBE levels above 100 ppb and another 13 households were at risk. The source in this case was a previously unreported gasoline spill from a car accident that took place in early December 1997.

Fifty miles away from these incidents, a school's bedrock well had been contaminated with 800 ppb of MTBE from a "mystery" spill. The location of the spill wasn't a mystery, however, inasmuch as an 18-inch circle of dead grass was found near a bedrock outcrop 300 feet upgradient of the well. Under that dead grass was 8 yards of gasoline-contaminated soil. The source could have been a lawnmower or any of the assorted cars and trucks customarily parked in the vicinity of the fractured outcrop.

With three contamination events in one week, it seemed as though we were in the midst of an MTBE epidemic! The daily news updates and howls from the public and politicians challenged our governor to take bold action. He determined that 1,000 household wells and all of the public drinking water supplies in the state should be tested for MTBE.

The Battle Plan

During the summer of 1998, the Maine Department of Environmental Protection (DEP), the Bureau of Health (BH), and the Maine Geological Survey developed a plan for selecting and sampling 1,000 household drinking-water supplies and 793 of the 830 nontransient public drinking-water supplies for MTBE. Four other major constituents of gasoline—benzene, toluene, ethyl benzene, and xylene (BTEX)—were tested for as well.

Initially 5,000 randomly selected residences were identified and then matched with census data to determine if they were on public or private drinking-water supplies. The list was pared down to 951 households confirmed to be on residential water supplies and also willing to participate. The sample points were entered into the state's Geographic Information System (GIS) so that maps could be generated.

A consultant was selected to take the samples. Laboratory analyses were performed by the Department of Human Services (DHS). The MTBE detection level for this project was 0.1 ppb. The health standard for MTBE in drinking water in Maine is 35 ppb; the action level for the DEP to respond with water treatment/remediation at a well is 25 ppb.

Lo and Behold!

Three months later the fieldwork was completed, and on October 13, 1998, the results were published. A full copy of the report, *The Presence of MTBE and Other Gasoline Compounds in Maine's Drinking Water: A Preliminary Report*, is available at <http://www.state.me.us/dhs/bob/mtbe.pdf>.

Of the household water supplies sampled, 15.8 percent had MTBE detected, 1.1 percent at levels exceed-

ing the state's drinking-water standard of 35 ppb. Other BTEX constituents were rarely found. MTBE was detected in 16 percent of the public water supplies tested, but no samples were above 35 ppb. Low levels of toluene were found in 13.1 percent of the public water supplies. For both types of water supplies, the contaminated wells were found throughout the state, from the southern, higher-populated counties, where RFG is mandated, to the northern, less-populated areas, where it is not. As we like to say up here, we found the stuff from Kittery to Fort Kent! Based on the study, it is estimated that somewhere between 1,400 and 5,200 domestic wells could be expected to have MTBE concentrations above 35 ppb. So far, only a few new MTBE-contaminated site cases have dribbled in to our office.

Follow-up data collected by the state indicate that small spills of gasoline unrelated to underground or aboveground fuel tanks can significantly impact a water resource. The DEP response staff visited the 14 homes found in the survey with contamination above the drinking water standard. The findings were somewhat surprising and disturbing because they went against the common assumption that MTBE contami-

nation would be associated with USTs and/or ASTs. Distance from gasoline tanks was factored into this study, and no statistically significant correlation was found. Let's look at a few choice examples, and I'll think you'll start to see where the problem lies.

Tools and Toys

A location with 260 ppb of MTBE was a rural site located in the southern coastal region. It seems that the owners of the house found their backyard bedrock outcrop a convenient place to store old engine parts. Chances are there may have been some backyard mechanical work going on there as well.

A mid-coastal island site had a hit of 236 ppb, but this time the suspected culprit was not auto repair but marine outboard motor repair. This finding is not at all uncommon; the DEP has found MTBE as well as waste oil contamination in wells at other coastal fishing communities.

In another example, 78 ppb was found at a mid-Maine inland site where the well was located in a shed attached to the house. Gas cans and a snowmobile were stored outside the shed and only 5 feet from the well. If that's not good enough reason for this well to become contaminated, last year, a truck with five 5-gallon gas cans in the bed caught fire some 300 to 400 feet upgradient from the well.

A 51 ppb "Small Surface Spill Identified" was a case where the gas tank on a car parked on a gravel driveway overlying a dug well had leaked for a week! It doesn't stop there; auto repairs routinely took place in a garage just 20 feet away from the well.

These are some of the more "extreme" cases, but four of the other sites with high levels of MTBE have no known source, except that the wells are in close proximity to the driveway or have gasoline-powered cars, trucks, or ATV's parked close by.

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If drips and drabs from backyard mechanics, leaking gas tanks along the roadside, or 10-gallon fuel delivery overfills can do this much damage, then Maine says "enough is enough."

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The Upshot

So, with the elevated levels of MTBE in RFG, it appears that a little drop will do ya. If drips and drabs from backyard mechanics, leaking gas tanks along the roadside, or 10-gallon fuel delivery overfills can do this much damage, then Maine says enough is enough. In May, 1998, Governor King of Maine notified EPA Administrator Carol Browner of his intent to exercise Maine's right to opt out of the reformulated gasoline program but asked EPA to withhold final action on the request until the drinking water study had been completed.

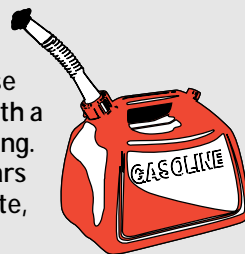
On February 24, Maine's Board of Environmental Protection adopted regulations that will replace RFG after May 1 with another type of gasoline sold widely in the South. This fuel, which is expected to sell for about the same price as RFG, will have to be replaced with a lower-volatility fuel in the summer of 2000 to keep the state in compliance with the Clean Air Act. The debate over MTBE, however, is still not over. Three bills have been introduced in the legislature that would ban MTBE altogether or set other gasoline standards.

DEP's current backlog of petroleum-contaminated sites is 300-plus, so we are not sure how we're going to skin the MTBE contamination cat if it indeed comes our way. We have dealt with MTBE since the mid 1980s in very low ppb levels at LUST sites. But, if the MTBE contamination is actually linked to such activities as filling and spilling gasoline in peoples' backyard, then the bottom line is that as long as we are hooked on gasoline tools and toys, dealing with this groundwater threat ain't gonna be easy.

To counter this environmental threat from gasoline-powered tools and toys, DEP developed some guidance for homeowners. I've summed up these little pearls of wisdom in hopes that they might help other states. Short of moving your well to a protected zone far upslope of your house and driveway, the most that you can do is to properly manage gasoline as well as all the other potentially toxic household substances. These tips are pretty much common sense but, based on our study, they are not common enough. ■

Tips for Keeping Your Gasoline and Household Chemicals Out of Your Water Supply

- ✓ **Keep as little gasoline around the home as possible.** Gasoline is both flammable and toxic (with or without MTBE), and it is one of the most dangerous chemicals you will encounter on a regular basis.
- ✓ **Store all gasoline (and other toxic chemicals) as far away and down-slope from your well (and your neighbor's well) as possible.**
- ✓ **Buy only what you need, and use it up!** Most manufacturers do not recommend storing gasoline in power equipment for more than a month, so make sure to run your equipment dry.
- ✓ **There are no cheap or easy answers for the proper disposal of gasoline that has become "gummy" or contaminated with dirt and water.** Check with your state or town to see if there is a household hazardous waste pick-up day in your area.
- ✓ **If you do end up with some left-over fresh gas at the end of a season of yard work, add fuel stabilizer before it gets old (generally more than 30 days from purchase).**
- ✓ **Never mix left-over gasoline/oil from a two-cycle engine with crankcase oil and take it to a service station or municipal trash transfer station.** Many times, these places burn the waste oil in space heaters and the gasoline could cause an explosion.
- ✓ **Never, ever—don't even think about—burning brush with leftover gasoline!**
- ✓ **Store gasoline in U.L.-listed (red for gasoline, blue for kerosene) containers.** Clearly label these containers to identify the contents and fit them with a spout to allow contents to be poured without spilling. Never store gasoline in containers such as glass jars or plastic milk jugs. These can break or deteriorate, causing a spill or a fire!
- ✓ **Store all gasoline containers in a well-ventilated shed or detached garage, away from the reach of children.**
- ✓ **Once a month, check for leaks from fuel tanks, engines, or storage containers (U.L.-listed plastic containers will not rust).**
- ✓ **Little leaks and spills can really add up and cause groundwater contamination.** Don't be a do-it-yourselfer when it comes to changing your car's crankcase oil (which may contain a small measure of MTBE). Have it done at an oil change shop or service station that recycles the waste oil. Paying \$19.95 every 3,000 miles is cheap insurance against groundwater contamination.



Remember:

- ✓ Buy only what you need.
- ✓ Use what you've got.
- ✓ Store away from your home and well.
- ✓ Watch for leaks.